

REMARKS

The pending application was filed on March 10, 2004 with claims 1-20. The Examiner issued a Final Office Action dated November 21, 2006 rejecting claims 1-6, 9-16, 19, and 20. In particular, the Examiner rejected claims 1, 3-4, 9-11, 13-14, and 19-20 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,575,532 to *Gross* in view of U.S. Patent No. 6,027,306 to *Bunker*, further in view of U.S. Patent No. 1,689,735 and rejected claims 2, 5-6, 12 and 15-16 under 35 U.S.C. § 103(a) as being unpatentable over *Gross*, *Bunker* and *Lösel* as previously applied, and further in view of U.S. Patent No. 4,571,937 to *Albers*.

Claims 1-6, 9-16, 19-20 were pending in this application. Claims 7, 8, 17 and 18 have been previously canceled without prejudice. In view of the amendments presented above, claims 1-6, 9-16, 19 and 20 are allowable, and the Examiner is respectfully requested to withdraw the rejections and issue a timely Notice of Allowance.

I. REJECTION OF CLAIMS 1, 3-4, 9-11, 13-14, AND 19-20 UNDER 35 U.S.C. § 103

The Examiner rejected claims 1, 3-4, 9-11, 13-14, and 19-20 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,575,532 to *Gross* in view of U.S. Patent No. 6,027,306 to *Bunker*, further in view of U.S. Patent No. 1,689,735 to *Lösel*. The Examiner stated that *Gross* and *Bunker* disclose the claimed invention but fail to disclose that the plurality of blades extending from the stationary body are positioned at an acute angle relative to a rotational axis of the rotatable body. The Examiner stated that *Lösel* discloses a

stationary member having a plurality of blades that are angled at an acute angle relative to a rotational axis of a shaft. The Examiner concluded that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the plurality of blades of *Gross* and *Bunker* angled at an acute angle as taught by *Lösel* to provide an effective labyrinth seal and to prolong the life of the seal.

As shown in Figure 2 and claimed in independent claims 1 and 11, the blades extending from the stationary body extend radially from the stationary body and at an acute angle. In particular, claims 1 and 11 state "a plurality of blades extending radially from a stationary body towards the rotatable body and generally forming at least one row of blades . . . and the plurality of blades extending radially from the stationary body are positioned at an acute angle relative to a rotational axis of the rotatable body in the at least one row of blades that is generally orthogonal to the rotational axis . . ." (emphasis added). Thus, the claimed blades extend radially toward the rotational body and are positioned at an acute angle relative to a rotational axis. In sharp contrast, *Lösel* does not disclose a plurality of blades forming a single row of blades. Rather, *Lösel* discloses a plurality of single blades that each form continuous rings. Furthermore, *Lösel* does not disclose blades that extend radially toward a rotatable body and are positioned at an acute angle relative to a rotational axis. Instead, the continuous rings disclosed in *Lösel* do not extend radially toward the rotatable body. Rather, the continuous rings of *Lösel* extend at an acute angle relative to a radial axis extending from the rotational axis, as shown in Figure 2 of *Lösel*. In contrast, the claimed invention is directed to blades the project radially and at an acute angle relative to a rotational axis. Such

a configuration, as shown in Figure 2 and claimed, is completely different than the configuration disclosed in *Lösel*. Thus, the blades disclosed in *Lösel* simply do not disclose the claimed structure, which is "the plurality of blades extending radially from the stationary body are positioned at an acute angle relative to a rotational axis of the rotatable body in the at least one row of blades that is generally orthogonal to the rotational axis . . ." (emphasis added).

Another way of describing the difference between the claimed invention and *Lösel* is that the intersection of the blade and the stationary support structure of *Lösel* is orthogonal to a rotational axis. The blade then extends from the intersection at an acute angle moving away from the base. In contrast, intersections of the claimed blades and the stationary support structures are not positioned orthogonal to the rotational axis; rather, the intersections of the claimed blades are positioned at an acute angle relative to the rotational axis. The blades of the claimed invention do not extend at an acute angle from the stationary structure. Instead, the blades extend radially. Therefore, claims 1 and 11, and those claims depending therefrom, are patentable, and the Examiner is respectfully requested to withdraw the rejection.

II. REJECTION OF CLAIMS 2, 5-6, 12 AND 15-16 UNDER 35 U.S.C. § 103

The Examiner rejected claims 2, 5-6, 12 and 15-16 under 35 U.S.C. § 103(a) as being unpatentable over *Gross*, *Bunker* and *Lösel* as previously applied, and further in view of U.S. Patent No. 4,571,937 to *Albers*. The Examiner stated that *Gross* discloses the invention

substantially as claimed but fails to disclose that the blades on the stationary body are annually spaced or formed intermittently and have an angle of about 1-89 degrees. The Examiner stated that *Albers* discloses a plurality of blades on a stationary body and the blades are angled to about 1-89 degrees from a rotational axis. The Examiner concluded that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the blades of *Gross* be segmented annularly or formed intermittently to provide a turbine that has substantially no efficiency losses.

Albers discloses a system for controlling the flow of leakage fluids and cooling air of a rotor proximate to a tip of a rotatable turbine blade. The system includes a plurality of blades extending radially inward from a stationary outer housing. The blades are positioned downstream of exhaust orifices in the tip of a turbine blade to direct cooling fluids exhausted from the turbine blades. The system is configured to redirect cooling fluids and combustion gases in a particular direction for most efficient use in downstream turbine stages. The system of *Albers* is not a seal.

Claims 2, 5-6, 12 and 15-16 depend from claims 1 and 11, which are patentable for the reasons previously set forth. Thus, claims 2, 5-6, 12 and 15-16 are patentable. Furthermore, as discussed in Section II, claims 1 and 11 state that "the plurality of blades extending radially from the stationary body are positioned at an acute angle relative to a rotational axis of the rotatable body in the at least one row of blades that is generally orthogonal to the rotational axis." Claims 1 and 11 also state that "a low pressure gas region in the turbine engine that is proximate to the plurality of blades extending radially from [[a]]

the rotatable body and opposite to the plurality of blades extending radially from the stationary body, wherein the low pressure region has a pressure less than the high pressure region." There exists no teaching or suggestion in *Albers*, *Gross* or *Bunker* for the combination of the blades of *Albers* with *Gross* or *Bunker* because the blades of *Albers* are used to redirect fluids flowing downstream of the turbine blade. Combination of these blades with the configurations disclosed in *Gross* and *Bunker* would yield blades on a rotational body with downstream blades on a stationary body for redirecting the downstream flow. The pumping action of the blades on the rotational body would direct fluids upstream and away from the blade of *Albers*.

In stark contrast, the claimed configuration includes blades extending from a stationary structure, wherein the blades are positioned upstream, between the blade on the rotational body and the high pressure region. Thus, in the claimed configuration, blades on the rotational body direct fluids towards the high pressure region and towards the blades extending from the stationary body. Combination of *Albers*, *Gross* and *Bunker* would not yield the claimed invention because the stationary blades disclosed in *Albers* would not be positioned between the blades extending from the rotational body and the high pressure region. Rather, the stationary blades disclosed in *Albers* would be positioned between the blades extending from the rotational body and the low region. And such a difference would not be obvious to one of ordinary skill in the art to redesign because no such motivation was known in the art and is not disclosed in *Albers*, *Gross* and *Bunker*. Thus, for at least these

reasons, amended claims 2, 5-6, 12 and 15-16 are allowable, and the Examiner is respectfully requested to withdraw the rejection.

CONCLUSION

For at least the reasons given above, claims 1-6, 9-16, 19 and 20 define patentable subject matter and are thus allowable. Should the Examiner believe that anything further is necessary in order to place the application in better condition for allowance, the Examiner is respectfully requested to contact the undersigned representative at the telephone number listed below.

No fees are believed due; however, the Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, to Deposit Account No. 50-0951.

Respectfully submitted,



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